Israel Journal of Mathematics 2015 vol.207 N2, pages 881-898

Invariant subrings and Jacobson radicals of Noetherian Hopf module algebras

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Abstract

© 2015, Hebrew University of Jerusalem. In this paper several classical facts known for group actions and group gradings on rings are extended to the case of a Noetherian H-module algebra A for a Hopf algebra H. When H is semisimple, a version of the Bergman-Isaacs result is proved, asserting the nilpotency of any onesided ideal of A whose intersection with the subalgebra of H-invariant elements A^H is nilpotent. Under the additional assumption that A is H-semiprime, it is established that the classical quotient ring Q(A) of A is the Ore localization of A at the set of H-invariant regular elements. When H is finite-dimensional cosemisimple, the Jacobson radical of A is shown to be stable under the action of H. More generally, these results are obtained for algebras over an arbitrary commutative base ring under suitable restrictions on the Hopf algebra and its action.

http://dx.doi.org/10.1007/s11856-015-1165-9